What is claimed is:

1. (Amended) A fixed-field alternating gradient electron accelerator comprising:

a vacuum container;

an alternating gradient electric magnet provided inside or outside of said vacuum container;

an electron beam inputting part to input electron beam into said vacuum container;

an accelerating apparatus to accelerate said electron beam; and

an electron beam transporting part to transport the accelerated electron beam from said vacuum container,

characterized in that said alternating gradient electric magnet forms a closed magnetic circuit consisting of a converging electric magnet and a diverging electric magnet provided on both sides of said converging electric magnet, or an alternating gradient electric magnet forms a closed magnetic circuit consisting of a converging electric magnet and a diverging part provided on both sides of said converging electric magnet, the coil part of the electric magnet making up the alternating gradient electric magnet has a divided coil structure, the respective currents of divided coil parts change the magnetic field coefficient k so that the respective currents of divided coil parts makes the magnetic field distribution in the diameter direction of a vacuum container $B = B_0 (r/r_0)^k$ (where B_0 is the magnetic field intensity on an input orbital, r_0 is an input orbital radius, and k is a magnetic field coefficient.), and control the zero chromatic aberration shape about the accelerated electron beam, the electron beam intensity and energy,

an internal target to generate X-ray is provided inside the vacuum container right before said electron beam transporting part, and

said accelerated electron beam and said X-ray can be selectively output.

2. (Amended) An electron accelerator as set forth in claim 1, characterized in that said electron beam inputting part is provided with an electron gun, and an electric magnet to change the orbital of the electron beam generated from said electron gun, and to input the electron beam into said vacuum container, and provided with an electric magnet for adjusting the second electron beam orbital near an electron beam inputting part of said alternating gradient electric magnet, said electron beam transporting part is provided with an electric magnet or a converging lens to change the electron beam orbital to outside of said vacuum container, an electric magnet for adjusting the first electron beam orbital is provided near an electron beam outputting part of said alternating gradient electric magnet, and said electron beam orbital is adjusted by said first and the second electric magnets for adjusting electron beam orbital.

3. (Amended) An electron accelerator as set forth in claim 1, characterized in that said electron

electron beam or said X-ray passing said electron beam transporting part is scanned.

4. An electron accelerator as set forth in any one of claims 1 to 3, characterized in that said accelerating apparatus is either of the high frequency acceleration system or of induction acceleration system, and is provided with at least a continuous output or a pulse oscillator.

5. (Amended) A fixed-field alternating gradient electron accelerator comprising:

a vacuum container;

an alternating gradient electric magnet provided inside or outside of said vacuum container;

an electron beam inputting part to input electron beam into said vacuum container; and

an electron beam transporting part to transport the accelerated electron beam from said vacuum container,

characterized in that said alternating gradient electric magnet forms a closed magnetic circuit consisting of a converging electric magnet and a diverging electric magnet provided on both sides of said converging electric magnet, or an alternating gradient electric magnet forms a closed magnetic circuit consisting of a converging electric magnet and a diverging part provided on both sides of said converging electric magnet, the coil part of the electric magnet making up the alternating gradient electric magnet has a divided coil structure, the respective currents of divided coil parts change the magnetic field coefficient k so that the respective currents of divided coil parts makes the magnetic field distribution in the diameter direction of a vacuum container $B = B_0 (r/r_0)^k$ (where B_0 is the magnetic field intensity on an input orbital, r_0 is an input orbital radius, and k is a magnetic field coefficient.), and control the zero chromatic aberration shape about the accelerated electron beam, the electron beam intensity and energy, and

an internal target to generate X-ray is provided in a vacuum

container right before said accelerated electron beam transporting part, said accelerated electron beam and said X-ray are selectively output, and said electron beam or said X-ray is scanned.

6. (deleted)

7. An electron accelerator as set forth in claim 5 or claim 6, characterized in that said electron beam or X-ray is scanned by a scanning part including at least a pinhole slit.

8. (Amended) An electron accelerator as set forth in any one of claims 5 to 7, characterized in that said electron beam transporting part comprises a septum electric magnet or a converging lens to change the orbital of the electron beam to outside of said vacuum container, and a first electric magnet for electron beam orbital adjustment is provided near the electron beam outputting part of said alternating gradient electric magnet.

9. An electron accelerator as set forth in claim 8, characterized in that said first electric magnet for electron beam orbital adjustment is provided in the position delayed by $\pi/2$ radian in the electron beam phase space with respect to said septum electric magnet or a converging lens.

10. An electron accelerator as set forth in any one of claims 5 to 8, characterized in that a second electric magnet for electron beam orbital adjustment is provided near the electron beam inputting part of said alternating gradient electric magnet, and said second electric magnet for electron beam orbital adjustment adjusts the orbital of electron beam together with said first electric magnet for electron beam orbital adjustment.

11. An electron accelerator as set forth in claim 10, characterized in that said first and second electric magnets for electron beam orbital adjustment are provided at the position so their relation is $n\pi$ radian (where n is an integer) in electron beam phase space.

12. (Amended) An electron accelerator as set forth in claim 5, characterized in that each current of said divided coil part is drive-controlled by the resistance connected in parallel with each coil

part, or by the current source connected to each coil part.

13. (Amended) A fixed-field alternating gradient electron accelerator comprising:

a vacuum container;

an alternating gradient electric magnet provided inside or outside of said vacuum container;

an electron beam inputting part to input electron beam into said vacuum container;

an accelerating apparatus to accelerate said electron beam;

an electric magnet to output the accelerate electron beam in said vacuum container; and

an electric magnet to output the accelerate electron beam in said vacuum container, and

an electron beam transporting part to transport the accelerated electron beam from said vacuum container,

characterized in that said alternating gradient electric magnet forms a closed magnetic circuit consisting of a converging electric magnet and a diverging electric magnet provided on both sides of said converging electric magnet, or an alternating gradient electric magnet forms a closed magnetic circuit consisting of a converging electric magnet and a diverging part provided on both sides of said converging electric magnet, the coil part of the electric magnet making up the alternating gradient electric magnet has a divided coil structure, the respective currents of divided coil parts change the magnetic field coefficient k so that the respective currents of divided coil parts makes the magnetic field distribution in the diameter direction of a vacuum container $B = B_0 (r/r_0)^k$ (where B_0 is the magnetic field intensity on an input orbital, r_0 is an input orbital radius, and k is a magnetic field coefficient.), and control the zero chromatic aberration shape about the accelerated electron beam, the electron beam intensity and energy.

14. An electron accelerator as set forth in claim 13, characterized in that each current of said divided coil part is

controlled by a resistance connected parallel to respective coil part.

15. An electron accelerator as set forth in claim 13,

characterized in that each current of said divided coil part is controlled by a current source connected to respective coil part.

16. (Amended) A radiation medical treatment apparatus using an electron accelerator, comprising:

an electron accelerator to selectively generate electron beam or X-ray;

an irradiation head;

a supporting part; and

a medical treating bed on which a patient lies,

characterized in that said electron accelerator is provided with a vacuum container, an alternating gradient electric magnet provided to inside or outside of said vacuum container, an electron beam inputting part to input electron beam into said vacuum container, an electron beam inputting part to input electron beam into said vacuum container, an accelerating apparatus to accelerate said electron beam, and an electron beam transporting part to transport the accelerated electron beam from said vacuum container, and said alternating gradient electric magnet forms a closed magnetic circuit consisting of a converging electric magnet and a diverging electric magnet provided on both sides of said converging electric magnet, or said alternating gradient electric magnet forms a closed magnetic circuit consisting of a converging electric magnet and a diverging part provided on both sides of said converging electric magnet, the coil part of the electric magnet making up said alternating gradient electric magnet has a divided coil structure, the respective currents of said divided coil parts change the magnetic field coefficient k so that the respective currents of said divided coil parts makes the magnetic field distribution in the diameter direction of a vacuum container $B = B_0 (r/r_0)^k$ (where B_0 is the magnetic field intensity on an input orbital, r_0 is an input orbital radius, and k is a magnetic field coefficient.), and control the zero chromatic aberration shape about said accelerated electron beam, the electron beam intensity and energy, an internal target is provided to generate X-ray in the vacuum container right before said electron beam transporting part, said accelerated

electron beam and X-ray are selectively output, and said electron beam or said X-ray is scanned.

17. A radiation medical treatment apparatus using an electron accelerator, comprising:

an accelerator to selectively generate electron beam or X-ray;

an irradiation head;

a supporting part; and

a medical treating bed on which a patient lies,

characterized in that said electron accelerator is the electron accelerator as set forth in any one of claims 1 to 15.